

FIELD VS. LABORATORY DISSOLUTION RATES OF MINERALS, GLASSES, AND OTHER REPOSITORY MATERIALS, W. L. Bourcier, C. J. Bruton, Lawrence Livermore National Laboratory, Livermore, California, and B. W. Christenson, G. B. Arehart, J. M. Lindsay, Institute of Geological and Nuclear Sciences, Taupo, New Zealand.

We are measuring dissolution rates and observing corrosion behavior of minerals, volcanic tuffs, fibercrete, metals, and borosilicate glasses in natural waters. These rates are compared to dissolution rates of the same materials measured in the laboratory. Our goal is to determine whether laboratory-derived rates can be used to predict rates in natural systems where factors such as minor elements and biological activity may be important.

In our first experiments at the Rotokawa geothermal area in New Zealand, samples were emplaced in acidic springs at 92°C and in acidic lake waters at 20°C. Results to date are qualitatively consistent with laboratory measured rates: quartz is not dissolving, feldspars and zeolites are dissolving slowly, and olivine and pyroxene are dissolving with vigor.

Further experiments are planned to cover a range of temperatures, pHs, and fluid compositions bracketing anticipated conditions in the near field at the proposed Yucca Mountain repository site.

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